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CONTENTS

PAGE

CORBET, A. Steven, F.R.E.S. A revision of the Malayan species of *Horaga* Moore (Lepidoptera: LYCAENIDAE) . . . . . 46–50, 6 figs.

FRASER, Lt.-Col. F. C., I.M.S. Retd., F.R.E.S. Results of the mission of P. Lepesmee, R. Paulian and A. Villiers in the Cameroons. Order Odonata . . . . . 35–42, 2 figs.

JORDAN, Karl, F.R.S., F.R.E.S. Two new Siphonaptera from the Belgian Congo . . 43–46, 3 figs.

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RESULTS OF THE MISSION OF P. LEPESMEE, R. PAULIAN AND A. VILLIERS IN THE CAMEROONS. ORDER ODONATA

By Lt.-Col. F. C. Fraser, I.M.S. Retd., F.R.E.S.

Dr. R. Paulian, to whom I am indebted for the opportunity of reporting on the present collection, states that it was made as a mere supplement to much other material collected, and thus, the sixty specimens which it contains, were just casuals netted here and there. From this, he opined that they might not be as valuable as would others which had been purposely sought for. Such, however, has not proved to be the case and this, I think, because the Odonata of tropical West Africa are still imperfectly known, and even the commoner species are not generally numerous in collections.

The localities collected in were: French West Africa: Ivory Coast, Port Bonet and Sassandra. British Cameroons: Bibundi. French Cameroons: Donala; Edea, S.E. of Donala; Mundeek, a railway station between Donala and N'Kongsamba; N'Kongsamba, the railway terminus of the Northern railway; Mt. N'Loanko, 1300–1500 m., a few miles to the N.E. of N'Kongsamba; Crater of the Eboga, a crater lake on the Manen Youba mountains to the N.W. of N'Kongsamba; Boland, on the road between N'Kongsamba and Dshang (French territory of the Bamende mountains); Yaounde; Makok near Yaounde, a primaeval forested plateau.

The collection contains sixty specimens comprising nineteen genera and twenty-three species, of which one genus and two species are new to science, whilst the females of three other species were hitherto unknown. Some other species are of interest on account of their rarity in collections. I take this opportunity to thank Dr. Paulian and the Director of the Museum National d'Histoire Naturelle Paris for the opportunity of examining this interesting collection and for the gift of duplicates.

Coenagrioidea.

Allocnemis pachystigma Selys.

The female of this species was unknown heretofore. It is of a robust nature like the male and similarly coloured except for the terminal segments of the abdomen, which always differ in the sexes of this genus. I have examined males in the McLachlan collection and have no doubt about the determination of these specimens.

Female. Abdomen 31 mm. Hind-wing 24 mm.

Head: labium yellow; labrum, anteclypeus, postclypeus and genae pale creamy yellow, vertex and occiput black with a broad yellow stripe running between the eyes at level of ocelli. Prothorax black with a pale yellow V-shaped mark on each side; thorax black with an antehumeral stripe which tapers to a point above, and two broad, lateral stripes, one situated on the mesepimeron, the other bordering the metepimeron below, all creamy yellow; beneath thorax pale greenish-yellow. Legs black with flexor surfaces of femora and extensor surfaces of tibiae yellow. Wings hyaline, venational details as in the male, 18 postnodals in fore-wings, 14 in the hind-wings; pterostigma quadrate, oblique, dark cinerous framed in black nervures, which are themselves framed inwardly with pale

greyish. Abdomen dark reddish-brown on dorsum, deepening apically to black, which forms broad annules on each of segments 3 to 6, segments 1 and 7 to 10 black, segment 9 with a large rounded greenish-yellow spot on each side. Anal appendages shortly conical, black. Ovipositor robust, extending beyond end of abdomen.

Habitat : Edea, 2 ♀♀, vii.39.

Elattoneura aethiopia sp. n. (fig. 1, *c*).

Male. Abdomen 37 mm. Hind-wing 23 mm.

Head, thorax, abdomen and legs entirely velvety black and without markings but the following parts pruinosed white : prothorax on sides and dorsum, lower half of dorsum of thorax and a broad stripe on each side, the two areas confluent, beneath thorax and bases

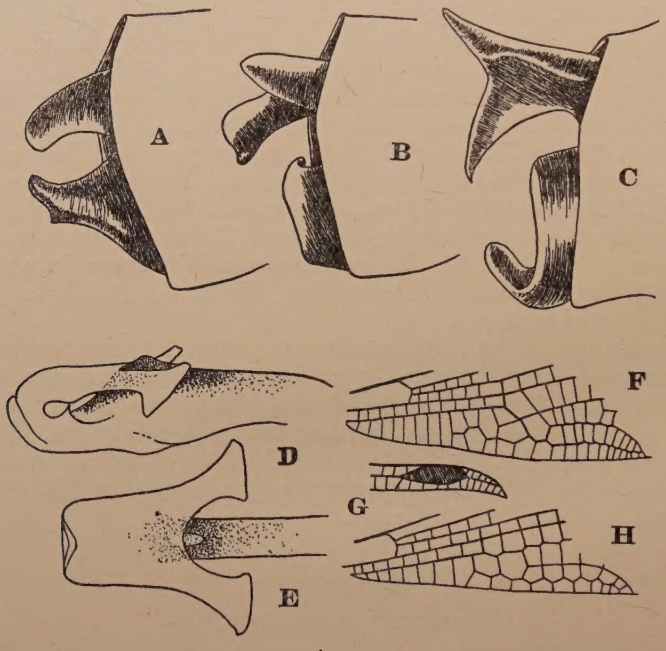

Fig. 1.—*a*, Anal appendages of *Ceriagrion corallinum* Campion ; *b*, the same of *Paulianagrion platystictoides* gen. et sp. n.; *c*, the same of *Elattoneura aethiopia* sp. n.; *d*, penis of *Paulianagrion platystictoides*, lateral view; *e*, the same dorsal view; *f*, base of wing of *Prophaon camereunica* (Sjöstedt). Note how much broader it is than in *Phaon iridipennis* (Burm.) shown in text-figure 1, *h*; *g*, Pterostigma of *Prophaon camereunica* (Sjöst.).

of legs, segment 1 of the abdomen laterally and dorsum of segments 9, 10 and apical half of 8, but this latter, in some, not pruinosed. *No pruinosity on the head.* Wings hyaline, costal margin in all palely clouded with greyish; neuration and pterostigma black, the latter subquadrate and diamond-shaped; 17–19 postnodals in fore-wings, 16 in the hind-wings. Anal appendages : superiors trigger-shaped, with the spine of the trigger almost as long as the hammer, which latter is acuminate and without a subapical spine as present in *E. mutata* (Selys); inferiors short and curled inwardly below as in the latter species, black.

Habitat: Mundeek and Yaounde, vii.39. Six adult males. This new species is distinguished from other African ones by the peculiar saddle-shaped distribution of the pruinescence on the thorax and by its absence on the head. From *E. mutata* also, by the absence of the subapical spine to superior anal appendages, the longer dorsal spine and the larger number of postnodals. From *E. frenulata* (Selys) and *E. simba* (Martin), the distribution of the pruinescence will suffice to distinguish the new species.

Paulianagrion gen. n. (fig. 2).

Robustly built Coenagrions with Platycnemine characters and partially coloured metallic; wings hyaline, venation mainly made up of tetragonal cells, postnodals numerous, 13 to 15 in number; arculus slightly distal to the level of the distal antenodal; anal tracheal crossing (Ac) situated about midway between the two antenodals; discoidal cell of fore-wing with costal side about half as long as the posterior one, acutely pointed distally;

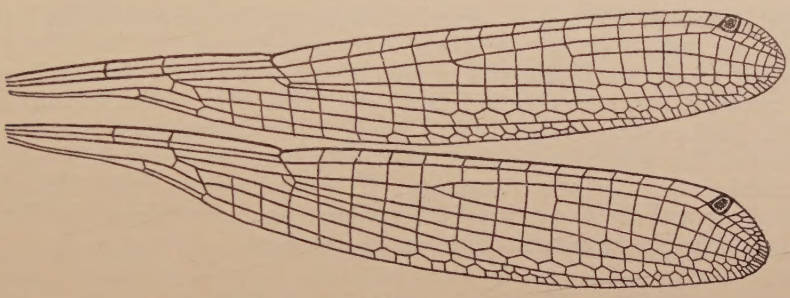

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Fig. 2.—Wings of *Paulianagrion platystictoides* gen. et sp. n.

that of hind-wing with costal side about three-fifths the length of posterior; anal vein parting from posterior border of wing a short distance before Ac and ending distal to the middle of the distance between nodus and pterostigma, straight in its proximal half, zig-zagged in its distal half; IRiii in fore-wing arising at subnodus, Riv + v a short distance before that level; Rii and Riii parting company 4 to 5 cells after the nodus; IRii arising 8 cells after the nodus; in the hind-wing, these veins arising 1 cell more proximally; pterostigma strongly braced, of Platystictine shape, subquadrate, costal side only about half the length of posterior, which latter is markedly curved and rounded; 2 rows of cells between C and Ri after the pterostigma in both wings.

Genotype—*Paulianagrion platystictoides* sp. n.
Distribution: Tropical West Africa.

Paulianagrion platystictoides sp. n. (fig. 1, *b*, *d*, and *e*).

Male: Abdomen 36 mm. Hind-wing 26 mm.

Head dull ochreous with a fine black line to base of postclypeus and a very broad transverse steely black band passing between the eyes at level of ocelli. Prothorax and thorax dull ochreous, increasing to a warmer, darker brown on dorsum; a broad mid-dorsal steely black fascia extending from prothorax to thorax and divided by the fine reddish-brown middorsal suture, a narrow humeral stripe and two small points of the same colour at upper ends of lateral sutures. Legs yellow with short robust black spines.

Abdomen pale ochreous with a broad steely black or dark green metallic band extending the whole length of middorsum from segments 1 to 7. On segment 1 this is divided by a fine middorsal yellow stripe which does not extend to base of segment. At the base of each segment, the dark band is invaded by the pale ground-colour of the sides to form slightly interrupted basal annules; segments 8 and 9 and an apical spot on segment 7 azure blue bordered narrowly by metallic black, segment 10 metallic black on dorsum. Anal appendages of half the length of segment 10, equal to each other in length; superiors resembling those of the *esme-melanoneura* group; seen from above they are broadly conical, seen in profile they are shaped like the butt of a revolver, the apex of the dorsal cone resembling the trigger; inferiors shell-like, curled longitudinally on themselves, truncate at apex. Wings hyaline, tinted with uniform yellow (but this colour possibly due to the teneral condition of the specimen), 15 postnodals to fore-wings, 13 in the hind-wings; pterostigma of Platystictine shape, its costal border very short, especially in the hind-wing where it is barely half the length of the posterior side, this latter being strongly rounded, the inner border very oblique and the outer less so and rounded, greyish-brown in centre and framed in thick black nervures.

Habitat: Mt. Bamboutos, near Dshang in the French part of the Bamende mountains, 1800–2000 m. A single very teneral male, vii.39. The type is deposited in the Paris Museum (a pair of wings has been detached, pressed and mounted and accompanies the type). This new species is named after Dr. R. Paulian and belongs to the family PLATYCNEMIDIDAE; the proximal portion of the wing is typical of this family, but the apical half might well be mistaken for that of a *Platysticta*. The duplication of the cells after the pterostigma and the robust build of the insect, coupled with its metallic markings, are strongly reminiscent of genus *Erythromma*.

Pseudagrion melanicterum Selys.

A common species confined to tropical West Africa and the Congo area. Habitat: Yaounde and N'Kongsamba, vii.39: 1 ♀, 15 ♂♂.

Ceriagrion corallinum Campion (fig. 1, *a*).

A species known from very few specimens but probably not uncommon where it occurs. Its distribution is similar to the last. A single ♂ from Makok, vii.39. Campion has described the anal appendages imperfectly and since these are rather homogeneous in the species, I here figure them for the first time.

Agriocnemis exilis Selys.

A widely distributed species throughout Africa except in the desert areas of the north. A single ♂ from Sassandra, 11.vi.39, is found in this collection.

Enallagma nigridorsum Selys.

A common species with a distribution similar to the last. The collection contains only a single ♂, from Sassandra, 11.vi.39.

Agrioidea.

Chlorocypha curta (Selys, 1853).

A widely spread species throughout tropical Africa but apparently not common anywhere. It is distinguished by the first six segments of the abdomen

red, the remainder pale blue, and by its restricted black markings which take the form of paired subapical spots on segments 2, 3 and sometimes on 4 to 6, although very much smaller on these. In a race to which I have given the provisional MSS. name of *bicolor*, the paired spots on segments 3 to 5 are confluent with moderately broad apical black rings. A pair in this collection are entirely typical, however.

Habitat: Bagang, 1250 m., vii.39: 1 ♂, 1 ♀.

Chlorocypha selysi (Karsch) (= *C. curta* (Selys, 1879)).

Habitat: 1 ♂ Makok, 500 m., vii.39. From material, notes and a long series of figures which I have been collecting over a long period, there seems sufficient evidence to show that *C. dispar* (Selys) possesses a number of races or subspecies—*rubida* Selys, *cyanofrons* Selys, and *selysi* Karsch. *C. dispar* represents the maximum of melanism developed and a long series of variation is found grading to the others *but these variations are invariably confined to a single district.* Of *rubida*, the initial description by Selys differs broadly from his last one, which appears to tally with *glauca* Selys. Typical *rubida* has the ground-colour of the abdomen red throughout, as stated in the first description; *glauca* has the first four segments pale blue; the markings in both are similar and hence has arisen the confusion. The two species *Libellago glaucifrons* Sjöst. and *grandis* Sjöst. are mere synonyms of *rubida* or *selysi*. The greatest confusion exists in this genus, which I hope to straighten out in a future paper; it would take up too much space in this.

The male in this collection has the markings greatly restricted.

Head black marked with greenish-yellow as follows: a small spot at apex of dorsum of epistome, a broad fascia on frons and vertex which extends posteriorwards on each side of vesicle; lastly, two tiny postocular, occipital spots. Thorax with middorsal carina finely yellow, an oval spot on antealar sinus, a narrow antehumeral stripe incomplete above, an equally narrow humeral stripe on upper half of dorsum and nearly interrupted at its middle, a broad fascia on posterior half of mesepimeron and a long pyriform spot on middle of metepimeron. Abdomen a beautiful carmine red throughout; segment 1 with dorsum black, the ground-colour invading it laterally, segment 2 with a somewhat cordate middorsal spot which is trilobate at its base, laterally two small yellow spots, segments 3 to 5 with paired subapical black spots, large and semilunar on 3, smaller on 4 and very small on 5. All following segments with fine apical black rings but this ring markedly broadened on segment 9; sides of segment 10 black.

(It is convenient to mention another synonym here, viz., that of *L. jejuna* Baum., which is actually *L. luminosa* Karsch (*C. luminosa* (Karsch).) Campion evidently overlooked Karsch's species (which Karsch figured) when naming the specimens in the British Museum, as these bear Baumann's name.

Chlorocypha cancellata (Selys).

Habitat: Mundeek, vii.39. There is a single male of this interesting species in the collection, distinguished from all others by its tessellated or window-frame pattern on the abdominal segments. This specimen has retained its colours and it is seen that the terminal four segments are pale blue, and not red as Selys stated in his description; the type had evidently undergone postmortem decomposition. The markings of the head and prothorax are similar to type but those of the thorax show up better: middorsal carina finely yellow, 2 very small rounded spots on antealar sinus, a rather broad

antehumeral stripe tapering above to a point, hooked outwardly below, a broad fascia on mesepimeron and the posterior and lower half of metepimeron greenish-yellow. The size is very small, as Selys states, and the venation is very close, as in *C. caligata* (Selys), which has a somewhat similar abdominal pattern.

Chlorocypha sp. ?

A male from Mundeek, vii.39, is too teneral to identify with any certainty.

Prophaon gen. n.

Prophaon camereunica (Sjöst.) (fig. 1, *f*, *g*, and *h*).

Habitat: 1 ♂, Doula, vii.39. This species, by its highly organised pterostigma and its broader anal field, 3 cells, then 2 cells deep in its more distal part, falls between *Phaon* and *Umma* and, I think, deserves generic rank which I now give under the name of *Prophaon*. It is distinguished from *Phaon* by the pterostigma fully developed instead of absent or rudimentary and by the presence of a rudimentary branch to the anal vein which is reflected basally as in *Umma* etc.

Genotype: *Phaon camereunica* Sjöstedt. Sjöstedt has not emphasised the bold structure of the pterostigma sufficiently; it is dilated inwardly and the radius appears to bifurcate to enclose it proximally.

Umma longistigma (Selys).

Habitat: A single ♀ from Doula, vii.39. It is an old specimen with the wings enfumed throughout but the cell middles clear. The pterostigma is black with pale cinereous centre. Enclosed in the insect's jaws is a small microlepidopteron.

Sapho orichalcea McLachlan.

A common but very local species confined to tropical West Africa. The present specimens have the wings dark olivaceous brown increasing along the hinder border to blackish-brown. The white bands are moderately narrow, begin at the level of the nodus and taper to posterior border of wings, the end being rather abruptly curved proximally. The pterostigma is pale rosaceous, framed in thick black nervures; that of fore-wing black for its posterior half and this part and the whole of underside thinly pruinosed.

Habitat: 2 ♀♀, Mundeek, vii.39. One specimen is slightly teneral and its pterostigma is pale golden in hue, whilst the white band is somewhat broader.

Anisoptera.

Eothemis zygoptera Ris.

A rare species confined to west tropical Africa; the type comes from the Cameroons.

Habitat: French Cameroons: Donala 2 ♀♀ which do not differ in any way from type.

Micromacromia camereunica Karsch.

There are two males of this rare species in the collection, one of which was apparently taken emerging, as it is in a very teneral condition. (By macerating

the wings of this latter specimen, it was possible to straighten and float them out like a transfer, so that a very satisfactory exhibit was obtained and identification made possible.) 1 ♂ Mundeek and another from N'Kongsamba.

Lokia incongruens (Karsch).

Only three males are known of this rare species; the female was hitherto unknown but is fortunately represented in this collection by two specimens, one fully adult, the other but freshly emerged and very teneral (this latter was also treated by maceration and with equally satisfactory results).

Female: Abdomen 30 mm. Hind-wing 35 mm.

Head: labium whitish, the middle lobe and apposed borders of the lateral broadly black; labrum black with two basal semilunar ochreous spots; rest of face ochreous inclining to ferruginous and with an ill-defined violaceous tinting of frons and vesicle; occiput dark reddish-brown, black behind but the eyes bordered with citron yellow. Prothorax and thorax black on dorsum, the latter with two broad antehumeral greenish-yellow diffuse stripes extending half-way up to antealar sinus, a complete narrow humeral stripe and the sides greenish-yellow marked with five black stripes as follows: a short superior posthumeral, two parallel ones on mesepimeron, the anterior one of which is confluent below with the black of dorsum, a short one on the lower part of the postero-lateral suture and a complete one on the centre of metepimeron. Beneath yellow with a black triangular marking. Legs black, anterior femora yellow on extensor surface. Wings hyaline, reticulation irregularly infuscated and with the cell middles clear; bases of both wings saffronated to the level of discoidal cells; 16 antenodals and 11–12 postnodals in fore-wings, 11 antenodals and 11–12 postnodals in hind-wings; all discoidal cells traversed once; an accessory vein to the bridge in most wings; a few doubled cells in the space IRiii-Rspl; distal antenodal complete; pterostigma dark reddish-brown, almost black, covering 3 cells; 3 rows of cells in anal field of fore-wing. Abdomen black, segments 1 and 2 with the sides broadly yellow, segments 3 to 7 with longitudinal dorsal yellow stripes bordering the middorsal carina closely on each side, segment 8 with a rounded apico-lateral spot, its sides dilated. Anal appendages shortly conical, black. (The teneral female has only traces of the markings appearing and the wings are uncoloured basally.)

Habitat: Cameroons: Marak, 500 m., 2 ♀♀, vii.39. The adult of these two specimens becomes the allotype and is deposited in the Paris Museum. These females are strikingly similar to those of *Potomarcha obscura* (Rambur), to which genus *Lokia* is most closely related.

Hadrothemis camerensis (Kirby).

Habitat: Edea, vii.39, a single, very teneral and crumpled ♀ has been determined by mounting the wings in the manner given above and also by the bright yellow, unmarked segment 3 of the abdomen, which is strongly reminiscent of *Pseudothemis zonata*. In the male, this same segment is pruinosed white, and of the female, Ris states: ("das 3 Abdomensegment hell?"). There is no doubt that this segment is wholly bright yellow in the female and, probably also, in the subadult male. Venational details of the present specimen are: 13 postnodals and 20 antenodals in fore-wings, 14 postnodals and 17 antenodals in hind-wings, 2 rows of cells between IRiii and Rspl and between MA and Mspl, discoidal cell in hind-wing traversed once, twice in the fore-wings, arculus at a level between the 2nd and 3rd antenodals, 4 rows of cells in discoidal field, 3 rows of cells in anal field of fore-wing, 8 cells in the subtrigone, pterostigma of great size and length, covering 6 cells.

Orthetrum chrysostigma chrysostigma (Burm.).

A widely distributed species throughout Africa. 1 ♂, Makak, 1 ♂, Bagang, 1250 m., and 1 ♂, N'Kongsamba, 800 m., vii.39.

Orthetrum chrysostigma guineense Ris.

This more restricted subspecies is confined to equatorial West Africa. It is represented in the collection by 4 ♂♂, from Bayang, 1250 m., Makak, 500 m., and Yaounde, vii.39.

Orthetrum stemmale capense Ris.

A common and widespread species throughout Africa except in desert tracts. There is a single male in this collection from Mt. N'Lonako, 1300–1500 m., vii.39. The abdomen is pruinosed except for the apical end of segment 7 and segments 8 to 10. Although a large specimen, there is only 1 row of cells between IRiii–Rspl.

Palpopleura lucia (Drury).

A widely distributed species throughout Africa save in the extreme north and south. There are five specimens in the collection, 4 ♂♂ which belong to var. *portia* and a single ♀, which is typical *lucia*. This female has the abdomen partly pruinosed bluish-white as in the adult male : dorsum of segments 2 to 4, more slightly so on 5 and 6, and lateral spots on segments 3 to 8. On segments 2 to 4, the middorsal carina and jugal sutures are finely mapped out in black. This is the first female in the genus which I have observed taking on pruinosity, although it shows no evidence of other gynandrous features. 3 ♂♂, var. *portia*, Makak, 1 ♂, Port Bonet, and 1 ♀, *lucia*, Port Bonet, 12.vi and ?, vii.39.

Trithemis nuptialis Karsch.

There is a single pair of this species in the collection, the female of which is indistinguishable from that of *T. stictica* (Burm.); although the two species are very closely related, I think, with Ris, that they are distinct. Whilst *stictica* appears to be more widely spread throughout Africa, *nuptialis* is restricted to the west central parts of tropical Africa and most specimens have come from the Cameroons. 1 ♂, Makak, 1 ♂, N'Kongsamba, 800–1000 m., vii.39.

Pantala flavescens (Fabr.).

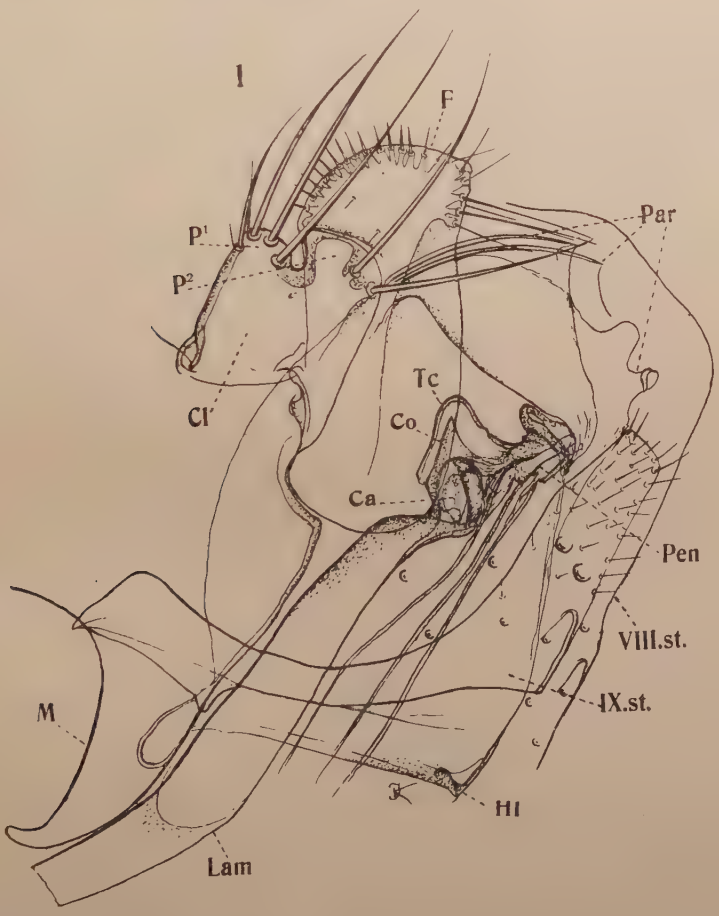
A single ♀ of this circumtropical species from Bibundi, vii.39.

TWO NEW SIPHONAPTERA FROM THE BELGIAN CONGO

By Karl Jordan, F.R.S., F.R.E.S.

(With Three Figures.)

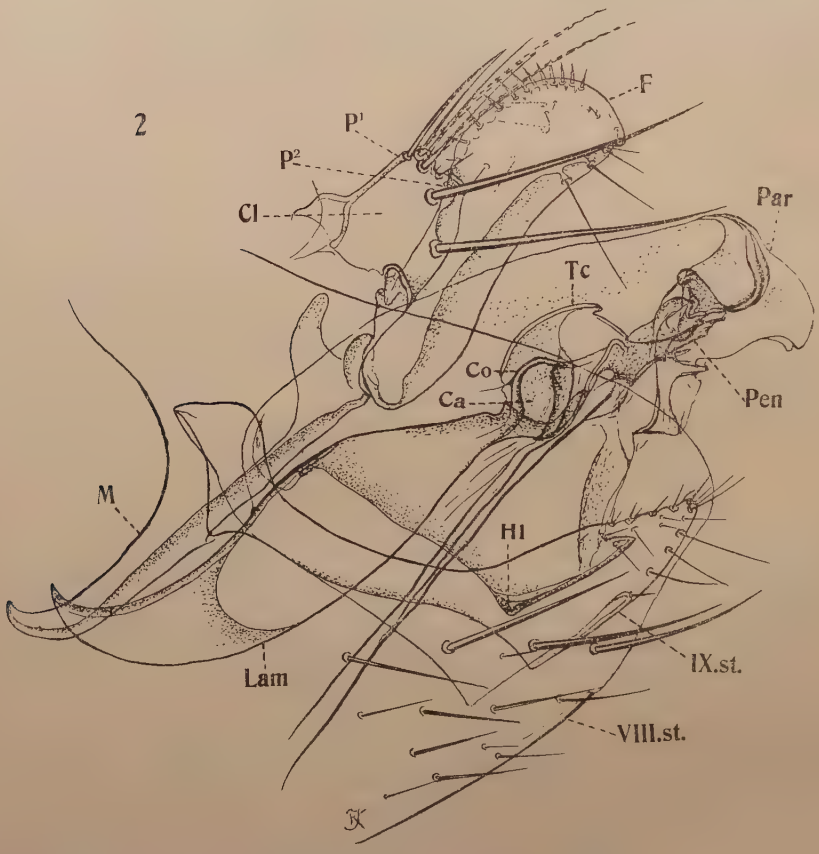
The two species here described were collected by Dr. R. Devignat at Blukwa, Congo Belge, and forwarded by Mr. G. H. E. Hopkins, Senior Medical Entomologist, Laboratory Services, of the Uganda Protectorate. Blukwa is a research station in the highlands west of Lake Albert. I am much indebted to Dr. Devignat for having kindly allowed me, as in former cases, to retain for the National Collection the types and other specimens required; some paratypes of the second new species have been returned to Mr. Hopkins for transmission to Blukwa.



1. **Ctenophthalmus devignati** sp. n. (fig. 1).

A single ♂, off "wild rat." The species is distinguished by the genital armature, especially sternum IX and the phallosome. The digitoid F resembles that of *Ct. evidens* Jord.

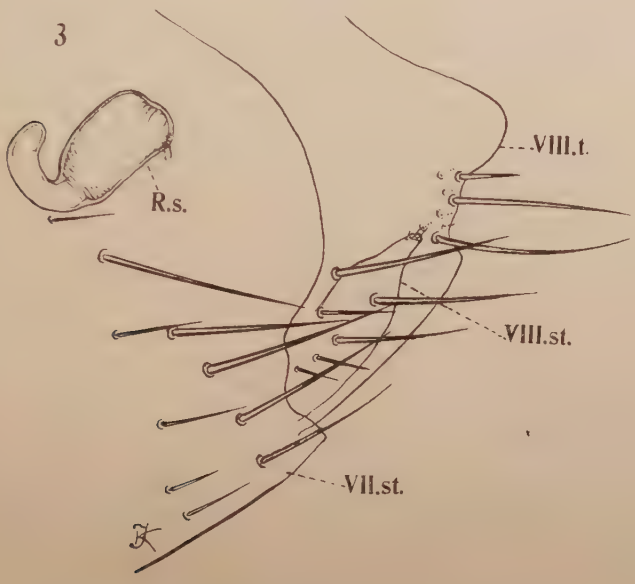
1929 and *Ct. modicus* Jord. 1933, whereas the central sclerite (Co) of the phallosome has the same peculiar shape as in *Ct. bacopus* Jord. 1933. Abdominal sternum VIII with 11 bristles on one side and 9 on the other, the two most distal bristles subventral and larger than the others, the upper one of the pair a little farther back than the lower. Apex of clasper (Cl) divided by a narrow sinus into two short projections, the upper one (P^1) rounded and bearing 4 long marginal bristles, of which the uppermost is the shortest, the lower process (P^2) subtruncate, with the upper angle smaller than 90°, moderately acute, near the ventral margin two bristles similar to the long ones of P^1. Digitoid F elongate-oblong; its posterior (= ventral) margin nearly straight; apical margin less truncate than in *Ct. modicus* and *Ct. evidens*, being dorsally almost evenly, but moderately, rounded from the ventral apical



angle to the apex of the clasper, and bearing about a dozen small spiniforms of the usual kind; below apical ventral angle 5 slender bristles, of which 2 are stronger than the others. Manubrium (M) of clasper less broad than in the species mentioned for comparison. Ventral arm of sternum IX very distinctive, being broad and long, ventrally straight, dorsally for a short distance beyond middle convex and at apex obliquely truncate; the juncture between right and left arms approximately at one-third. Lamina of phallosome (Lam) narrow, ending proximally with a short narrow upturned point, its distal end (Co), forming the dorsal side of the capsule (Ca), not arched as in most species, but directed upward-distad and produced into a sharp angle as in *Ct. bacopus*; the covering sclerite (Tc, tectum) above the

capsule very slightly concave dorsally and very strongly convex distally; from the distal side of the penis-tube (Pen) a long line, the margin of a subterminal sclerite, extends upwards, curving frontad near dorsal margin of phallosome; dorsal margin of paramere (Par) strongly sclerotised, appearing as a gently curved convex line (one each side) about the width of the large bristles of the clasper; the feebly sclerotised terminal margin of the phallosome forms on each side two lobes, the upper one rounded, the lower one smaller, with what appears to be a transverse fold near its apex; the outer covering mantle of the phallosome extends far down proximally, its heel (Hl) nearly rectangular and rather strongly sclerotised.

Length 2·3 mm.; hind femur 0·40 mm.



2. **Ctenophthalmus phyris** sp. n. (figs. 2 and 3).

One ♂ and 4 ♀♀ in the same tube and presumably obtained together, on "wild rat." As in some other cases, I cannot be quite certain without further data that the ♀♀ belong to the ♂; the latter is the type of the species, distinguished from all the other Ctenophthalmi by the genitalia.

Sternum VIII (fig. 2) with 14 bristles on one side and 11 on the other (in the single specimen !), the 3 distal ones long and strong and placed in an oblique row, the ventral bristle of the row being the most distal. Manubrium (M) of clasper narrow. Apex of clasper divided by a very shallow sinus into an upper process P^1, which bears 2 long and 4 shorter and thinner bristles, and a lower process P^2, of which the upper angle is effaced and the lower one rounded; between P^1 and P^2 a small marginal hair, below which there is a large bristle and at ventral margin another of equal size, the former being placed midway between the ventral one and the apex of P^1. Digitoid F somewhat resembling that of *Ct. eximius* Jord. & Roths. 1913, narrow from base to level of apex of clasper, the projecting apical portion broader, ventrally feebly concave and dorsally rounded from the ventral apical angle to the apex of the clasper, this rounded margin bearing 11 small spiniforms of the usual type. Ventral arm of sternum IX elongate-triangular, distinctive, narrowed nearly to a point distally, dorsally somewhat convex in middle, ventrally straight in proximal half and gently rounded upward in distal

half; at dorsal margin several small bristles, below them a few more, at and near apex 3 or 4 and along ventral margin 4, of which the 3 posterior ones are longish, but thin. Lamina of phallosome (Lam) curved up at proximal end, somewhat resembling the manubrium M; dorsal sclerite (Co) of capsule (Ca) convex, not angulate distally, tectum (Tc) slightly convex, not dome-shaped as in the previous species; apical section of phallosome (Par) much narrower than median section, ending on right and left sides with a broad obtuse hook directed downwards; from above the apical penis-tube (Pen) three approximated sclerotised lines (margins of sclerites) curve distad-upward, meeting at the dorsal margin the subterminal line, which is much shorter than in *Ct. devignati*; near middle of phallosome the outer covering (mantle) much extended downward, its vertical and ventral margins forming a nearly rectangular, well-sclerotised heel (Hl); the ventral margin strongly sclerotised from the heel for some distance, the conspicuous line ending (lateral aspect) with a short hook turned upward-forward. Sternum VII of ♀ (fig. 3) with one lateral sinus as in *Ct. acanthurus* Jord. & Roths. 1913, *Ct. modicus* Jord. 1933 and others; sinus rather wide and deep, somewhat irregular, the lobe above it large and rounded, the ventral lobe quite small, short, truncate or rounded. Tergum VIII with some short bristles above the stigma as in *Ct. modicus*, at apical margin of widened area of VIII t. with two apical marginal bristles of which the upper one is much shorter than the lower, above them the apex rounded-projecting. Sternum VIII rather broad with short neck. Body of spermatheca (R.s.) longer than tail, slightly variable.

Length ♂ 2·2, ♀ 2·3–2·5 mm.; hind femur ♂ 0·35, ♀ 0·37–0·40 mm.

A REVISION OF THE MALAYAN SPECIES OF *HORAGA* MOORE (LEPIDOPTERA: LYCAENIDAE)

By A. Steven Corbet, F.R.E.S.

Hitherto, no author has correctly placed the constituent forms of the collective species of the Indo-Australian genus *Horaga*, the difficulty being due, in the main, to the great similarity between *H. onyx* (Mre.) and the species which, it appears, must now be known as *H. syrinx* (Feld.). In males of the Malaysian representatives of the latter species, the white discal spot on the fore-wing may be present or absent, and there is a considerable variation in the width of the white discal bands on the underside. The male clasper of *H. onyx* differs constantly from that of *H. syrinx* throughout its range.

Horaga Mre.

Horaga Moore, 1881, *Lep. Ceylon* **1**: 98. Type = *Thecla onyx* Mre.

Key for the separation of the Malaysian species of *Horaga* Mre.

1(2). UnH without a white post-discal band. ♂ unF with a narrow black brand along vein 1 . . . . . *achaja.*

2. UnH with a white band.

3(10). UnH white post-discal band not extended to the termen.

4(7). ♂ without a brand along dorsum on unF. UnH white band narrow and uniform throughout, not narrowing in space 5.

5(6). UnH post-discal band overlaid with green metallic scales, sometimes throughout its length but always in spaces 6 and 7 . . . *amethystus.*

6. UnH post-discal band (which may be almost obsolete in ♂), not green scaled above vein 3 . . . . . *albimacula.*

7. ♂ with an ochreous brand along dorsum on unF. UnH white band more or less broad and usually narrowing in space 5.

8(9). Up purple blue in ♂, duller and dingier in ♀. ♂ F apex quadrate: clasper clavate . . . . . *onyx.*

9. Up bright clear blue in ♂, purple blue in ♀, but not as dingy as in *onyx*. Un usually more ochreous than in *onyx*. ♂ F apex acute: clasper tapering. F white discal spot usually narrower on both surfaces than in corresponding *onyx* subspecies . . . . . *syrinx.*

10. UnH with white discal band extended to the termen, this white area bearing a dark brown cell-end spot, and series of post-discal and submarginal spots. General appearance suggests an aberrative *Araotes lapithis* Mre. ♂ unknown . . . . . *araotina.*

Horaga amethystus purpurescens subsp. n.

Horaga amethystus H. H. Druce, 1902, *Proc. zool. Soc. Lond.* **1902**: 118, pl. xi, f. 4 ♂, 5 ♀; British North Borneo.

This Malaysian species was entirely overlooked in Seitz. In the female of the Malayan race, the ground-colour is more lustrous purple and the white discal spot on the fore-wing is more prominent than in the nominotypical form.

♂. *Upperside.* Rich purple blue. The fore-wing has a black costal and distal border, which increases from 1 mm. at vein 1 to 2 mm. at vein 6. The hind-wing is black bordered along the costa and termen; the distal border is rather irregular, inwardly diffuse, and increases towards the apex and tornus. A very narrow pale blue anteterminal line runs between veins 1b and 3 on the hind-wing. The white-tipped black tails are of the same length as in Malaysian *H. albimacula*. Cilia black on the fore-wing, becoming white at the tornus and white on the hind-wing. Head, thorax and abdomen black.

Underside. Ochreous brown, greyer brown in the distal half of the fore-wing. The narrow white discal band on the fore-wing is almost uniform, but narrows slightly towards the costa. On the hind-wing, the very narrow white discal band is heavily scaled with metallic green and inwardly defined by a dark brown line: this line is straight from the costa to vein 2, where it is broken, and then is angled at vein 1b. There are no black submarginal spots in spaces 4 and 5. Cilia greyish-brown on the fore-wing, becoming greyish-white at the tornus, and greyish-white on the hind-wing. Thorax and abdomen greyish-white. Legs white, ringed with black. Antennae black, very narrowly ringed with white.

Wing expanse 23 mm.

Holotype. Malay Peninsula: Negri Sembilan, Port Dickson, 9.i.1938 (*Ben, Selangor Museum collector*). In Selangor Museum.

♀. *Upperside.* Lustrous pale purple, with both wings broadly bordered with black. On the fore-wing, the black border reaches the subcostal vein and, near the cell-end, turns down towards the tornus, where it is inturned for a short distance. On the hind-wing, all margins are broadly bordered with black; the inner edge of the border is very diffuse and the veins are dark dusted in the distal half of the wing. A very narrow, pale, bluish-white anteterminal line extends from the tornus to vein 5. The fore-wing cell is closed by a small white spot (about 1 mm. broad), which is continued rather obscurely into spaces 3 and 2 below.

Underside. Colour and markings as in the male, except that the hind-wing post-discal band is slightly broader.

Wing expanse 29 mm.

Allotype. Malay Peninsula : Selangor, Bukit Kutu, 3300 feet, 28.ix.1932 (*H. M. Pendlebury*). In Selangor Museum. Other females, which hardly differ, examined from Malay Peninsula, 1929–1931 (*H. Gunnery*); Selangor, Sungei Buloh, i.v.1929 (*A. S. Corbet*); Rhio Archipelago, Karimon Islands, Pulau Parit, 500 feet, 26.xii.1937 (*J. N. Eliot*). In a British Museum female from Mergui, King Island, xii.1923 (*Brigadier W. H. Evans*), the purple area is more extensive.

Horaga amethystus overdijkinki subsp. n.

♀. *Upperside.* Differs from *amethystus* H. H. Drc. ♀, from Borneo, in the deep, clear, lustrous blue ground-colour, more purple in a sidelight, and the narrower black bordering which is arranged as in Malayan *purpurescens* ♀ but more clearly defined : the fore-wing white discal spot is slightly larger than in *purpurescens*.

Underside. As in *amethystus* but the fore-wing white band is more dilated near the cell-end, and the hind-wing black submarginal spots in spaces 1b, 2 and 3 are smaller.

Wing expanse 24·5 mm.

Holotype. Java : Mt. Halimon, near Soekaboemi, iv.1927 (*G. Overdijkink*). In British Museum, *ex* Coll. Joicey.

Horaga amethystus isna subsp. n.

♂. *Upperside.* As in *amethystus* ♂, from Borneo, but the colour is a dull brownish-purple and the black bordering is slightly narrower : a white spot at the cell-end on the fore-wing as in *purpurescens* ♀, and continued obscurely into spaces 3 and 2.

Underside. As in *amethystus* ♂, but the fore-wing white band is broader, the hind-wing post-discal band is evenly curved, and the black subtornal spots are smaller.

Wing expanse 24·5 mm.

Holotype. Nias : Hili Madjedja, 1895 (*I. Z. Kannegieter*). In British Museum, *ex* Coll. van de Poll and Coll. Adams.

Horaga albimacula malaya subsp. n.

" *Sithon* " *albimacula* Wood-Mason & de Nicéville, 1881, *J. asiat. Soc. Bengal* **50** : 249; ♂, South Andaman Islands.

Horaga viola Corbet & Pendlebury (*nec* Moore), 1934, *Butt. Malay Pen.*, pl. xiv, f. 198 ♂.

♂. *Upperside.* Differs from the subspecies *viola* Mre. ♂, from Sikkim, in the narrower and more lenticular white hyaline spot on the fore-wing. On the hind-wing, a very narrow, pale blue anteterminal line extends from the tornus to vein 4, and black submarginal spots can be distinguished in spaces 1c, 2 and 3. Usually, but not invariably, each wing has some blue scaling in the basal half.

Underside. The fore-wing white hyaline spot is united with a white non-hyaline area extending along the inner margin to the wing base. On the hind-wing, the white post-discal band is almost obsolete, but its inner edge is defined by a dark brown line. There is a series of black submarginal spots, inwardly bordered by metallic green lunules, the spot in space 2 is very large and those in spaces 3, 4 and 5 are smaller and decrease in size : the large grey area in space 1c and the black spot in space 1b are inwardly bordered with metallic green, as is the distal edge of the post-discal band in the lower half of the wing. A very narrow white anteterminal line extends from the tornus to vein 6.

Wing expanse 23·5 mm.

Holotype. Malay Peninsula : Singapore, i.iv.1936 (*J. N. Eliot*).

♀. *Upperside.* The fore-wing termen is more rounded and the basal halves of the wings are more generously scaled with purple blue than in the male.

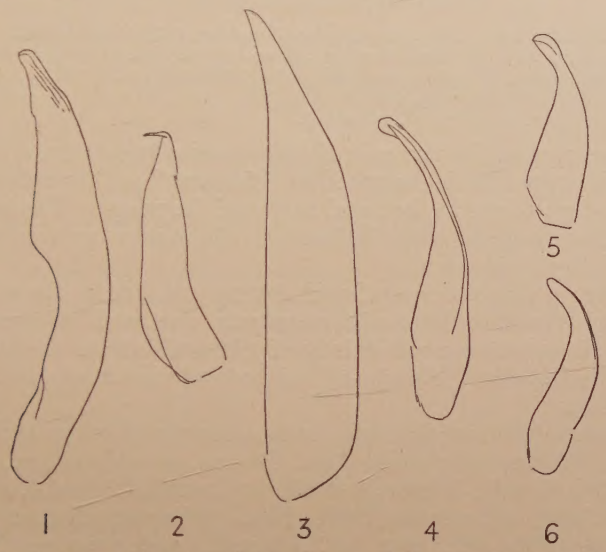
Underside. As in the male, except that the white post-discal band is more prominent.

Wing expanse 23·5 mm.

Allotype. Malay Peninsula: Singapore, Blakang Mati, 11.xii.1937 (*J. N. Eliot*). Both types in the British Museum. The Selangor Museum has a male from Kedah Peak, 3950 feet, 21.iii.1928, (*H. M. Pendlebury*) resembling the holotype.

Further Malaysian subspecies are *albistigmata* Moult., Borneo, and *anara* Fruh., Java (Seitz, pl. 157 i 9 ♂; Piepers & Snellen, pl. xxvii, f. 165 ♂). I think that the female holotype of *chalcedonyx* Fruh.[1] is an *albimacula* form, in which case the name falls to that of Moulton.

Malaysian females of *H. albimacula*, *H. onyx* and *H. syrinx* are often very similar but, in the first two, the upperside of the fore-wing is very broadly dark dusted, while in the last named most of the hind-wing is purple-blue below vein 6. Apart from size, females of *H. albimacula* and *H. onyx* from Malaya are hardly separable.



Figs. 1–6.—Male clasper of (1) *Horaga lefebvrei osma* Fruh., Mindanao, (2) *H. achaja* Fruh., Siam, (3) *H. amethystus amethystus* H. H. Drc., Borneo, ♂ holotype, (4) *H. albimacula malaya* subsp. n., Malaya, (5) *H. onyx halba* Dist., Malaya, (6) *H. syrinx maenala* (Hew.), Borneo, ♂ holotype.
All drawings of the same magnification.

Horaga onyx halba Dist.

Thecla onyx Moore, 1857, in Horsfield & Moore, *Cat. Lep. Mus. E.I.Co.* **1** : 30; ♂, Himalayas.
Horaga halba Distant, 1886, *Rhop. Malay.* : 460, pl. xliv, f. 23 ♂; Penang.
H. onyx halba Seitz, 1926, *Grossschmett. Erde* **9** : 982.

H. onyx is common in Ceylon and from Sikkim to Burma, but it is rare in Malaysia. Forms which have been ascertained to be subspecies are *cingalensis* Mre., Ceylon, *sardonyx* Fruh.,[2] Sumatra, *corniculum* H. H. Drc., Borneo (Seitz, pl. 147 b 8 ♂ und., c 1 ♂), *zuniga* Fruh., Nias (Seitz, pl. 157 i 5 ♂, 6 ♂ und., 7 ♀) and *rana* Nic. (= *andamana* Mre.), Andamans. The description and figure of *onyxitis* Fruh.[3] (I have not seen the type) fits a male of *corniculum* with a

[1] *Horaga moulmeina chalcedonyx* Fruhstorfer, 1914, *Deuts. ent. Z.* "*Iris*" **28** : 33; ♀ *nec* "♂," Borneo, Sintang.
[2] *Horaga moulmeina sardonyx* Fruhstorfer, 1914, *Deuts. ent. Z.* "*Iris*" **28** : 33; ♂, North-east Sumatra.
[3] *Horaga onyxitis* Fruhstorfer, 1914, *Deuts. ent. Z.* "*Iris*" **28** : 34; ♂, Borneo, Sintang. Figured in Seitz, pl. 157 i 8 ♂.

narrow band on the hind-wing beneath : I hardly think that it can be allied to *H. albimacula* as Fruhstorfer supposed.

Horaga onyx fruhstorferi subsp. n.

♂. *Upperside.* Differs from *corniculum* H. H. Drc. ♂, from Borneo, in the clearer purple-blue ground-colour, the narrower black bordering, that on the hind-wing much narrower, and the larger white discal spot on the fore-wing.

Underside. As in *corniculum*, except that the black subtornal spots on the hind-wing are rather larger.

Wing expanse 26 mm.

Holotype. CENTRAL JAVA : 1896 (*H. Fruhstorfer*). In British Museum. Unique.

Horaga syrinx maenala (Hew.).

Myrina syrinx C. Felder, 1860, *Sitzb. Akad. Wiss. Wien* **40** : 452; ♀, Amboina.
M. maenala Hewitson, 1869, *Ill. diurn. Lep. Lyc. Supp.* : 7, pl. iii, f. 85, 86 ♂; Borneo.
Horaga affinis H. H. Druce, 1895, *Proc. zool. Soc. Lond.* **1895** : 611, pl. xxxiv, f. 9 ♂; Labuan.
H. maenala Seitz, 1926, *Grossschmett. Erde* **9** : 982.
H. affinis Seitz, 1926, *loc. cit.* : 982, pl. 147 c 2 ♂.

Felder's description fits the only *Horaga* species known from the Moluccas, except that the upperside is described as " fuscous " and no reference is made to the greyish-blue colour in the basal halves of the wings. The type specimen appears to be lost, but the north Indian race of the same species was identified as *syrinx* Feld. by Hewitson.[4]

This widely ranging species is found from north India, through Malaysia, to the Philippines and at least as far eastward as the Celebes and Moluccas. The Malayan representative, which is hardly separable from the Bornean form, occurs from the Langkawi Islands to Singapore and has been taken on Fraser's Hill at 4000 feet.

Other *Horaga* forms which have been ascertained to be *syrinx* races are *sikkima* Mre., Sikkim, *moulmeina* Mre., Burma, *onychina* Stgr., Java (Seitz, pl. 157 i 2 ♂, 3 ♀, 4 und.; Piepers & Snellen, pl. xxvii, f. 164 a ♂, b ♀), *holothura* Swinh., East Java, and *artontes* Fruh., Nias. The very distinct races *ciniata* (Hew.), Celebes (Seitz, pl. 158 a 1 ♀, 2 ♀ und.) and *permagna* Fruh., North Celebes (Seitz, pl. 158 a 3 ♂) have no blue on the upperside.

Horaga araotina Evans.

Horaga araotina Evans, 1933, *J. F.M.S. Mus.* **17** : 413; ♀, Malay Peninsula, Pulau Angsa, off the Selangor coast.

Known only from the unique type.

Horaga achaja Fruh.,[5] known only from Siam, is figured in Seitz, pl. 158 a 9 ♂. *H. lefebvrei* (Feld.) is confined to the Philippines.

Of the *Horaga* forms mentioned in this paper, the types have been examined in the British Museum of *albistigmata* Moult., *amethystus* H. H. Drc., and *holothura* Swinh. and those denominated by Fruhstorfer (except *achaja*, *araotina* Evans, *onyxitis* and *permagna*), Hewitson and Moore.

I am much indebted to Captains J. N. Eliot and C. F. Cowan, of the Royal Artillery, and to Mr. H. M. Pendlebury, Director of the Selangor Museum, for the loan of their *Horaga* material.

[4] *Myrina syrinx* Felder, Hewitson, 1863, *Ill. diurn Lep. Lyc.* : 34, pl. xiv, f. 32, 33 ♂; North India.

[5] *Horaga achaja* Fruhstorfer, 1911, *Berlin. ent. Z.* **56** : 233; ♂, Siam, Hinlap.

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